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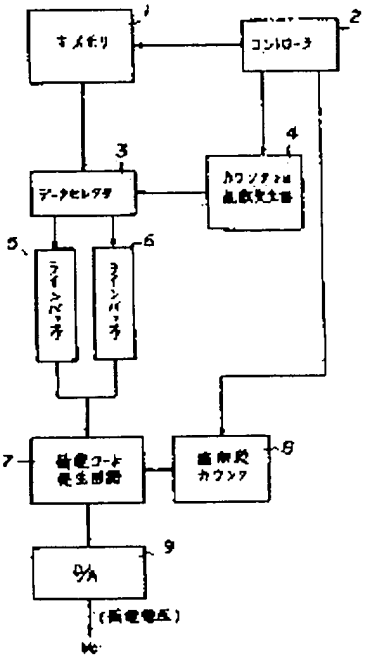
(54) INK JET RECORDER

(57)Abstract:
PURPOSE: To obtain a stable picture where joints between lines are inconspicuous by using a part or all of parts between dots for joints of a preceding main scanning or the next main scanning to scatter the effect of variation in paper feed or variation of dot positions to all regions.
CONSTITUTION: Picture data is stored in a main memory 1 and transmitted toward a line buffer according to the order of print by a command of a controller 2. Dot data of an overlapped part to be printed by the 2nd main scanning is transmitted to a line buffer 6 by a data selector 3. When the arrangement of print dot of the overlapped part is regular, the data selector 3 is designated by a counter 4, and when the arrangement is at random, it is designated by a random number generator 4. Print data is transmitted to an electric charge code generating circuit 7 at each one scanning from two line buffers 5, 6, the electric charge code is fed to a D/A converter 9 at the circuit 7 based on the content of a deflection counter 8 and converted into an analog electric charge voltage.



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(54) Title of the Invention: Ink Jet Recording Device

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Specification

1. Title of the Invention

Ink Jet Recording Device

2. Claims

(1) An ink jet recording device wherein the paper feed for each main scan is smaller than the width of said main scan, [said device being] provided with a means for forming an overlapping part wherein two adjacent main scans overlap and a means for arranging ink dots in said overlapping parts such that they do not fall on top of one another.

(2) An ink jet recording device as claimed in Claim (1) wherein said paper feed width is half of said scanning width.

(3) An ink jet recording device as claimed in Claim (1) or Claim (2) wherein the arrangement of dots by said means for arrangement prints odd numbered ranks in the first main scan and prints even numbered ranks in the second main scan.

(4) An ink jet recording device as claimed in Claim (1) or Claim (2) wherein the arrangement of dots by said means for arrangement prints odd numbered ranks on every other row to alternate

with even ranks in the first main scan and prints in the places not printed the first time in the second main scan.

(5) An ink jet recording device as claimed in Claim (1) or Claim (2) wherein there is random selection of whether the arrangement of dots by said means for arrangement is printed in the first or second main scan.

3. Detailed Description of the Invention

Field of Technology

The present invention relates to an improvement in the printing and paper feed in an ink jet recording device for recording desired figures on a recording medium while moving a nozzle relative to the recording medium with the ink drops deflected at a right angle to this relative movement.

Prior Art

Conventionally, in recording devices have been provided with a recording head wherein are arranged a plurality of nozzles in a perpendicular orientation and have recorded by this recording head scanning horizontally at a right angle to the direction of feed for the recording media and the feeding of the recording media, it has been difficult to record without the junction between the bottom ranks of the printing by a first main scan by the recording head and the top printing by the next main scan being obvious. More specifically, if the bottom ranks of the printing by the first main scan and the top ranks of the printing by the next main scan overlap too much, the concentration of that part increases, and the junction blackens and becomes obvious. and stable image quality is not maintained.

Purpose

The present invention is a solution for the demerit mentioned above and provides an ink jet recording device such that a stable image is obtained without the junction between scans being obvious.

Constitution

The constitution of the present invention will be described based on embodiments in the following.

FIG. 1 is a schematic diagram showing the scanning method when an image is formed by a charge deflection inkjet recording device, and the vertical matrix position is determined by a 16 rank deflection, with the horizontal positioning of the matrix determined by the head scanning in the horizontal direction. First, 16 ranks are printed in a first main scan A. Next, the paper is fed 8 ranks (secondary scan), and the second main scan B is performed. At this time there is an 8 rank overlap between the first and second scans, and this overlapping part is divided into the dots printed by the first main scan A and the second main scan B.

FIG. 2 – FIG. 4 are figures that explain the printing dot arrangement in the overlapping part. FIG. 2 shows an example of printing where the odd numbered ranks A_1, A_3, A_5 and A_7 (circles filled in with cross-hatching) of the overlapping part print in the first main scan A, and the even numbered ranks B_{10}, B_{12}, B_{14} and B_{16} (white circles) of the overlapping part print in the second main scan.

FIG. 3 shows an example where every other row in the odd numbered ranks and in the rows between these the even numbered ranks are printed (circles filled with cross-hatching) in the first main scan A, and in the second main scan B, the dots in the overlapping part not printed (white circles) in the first scan are printed.

FIG. 4 Shows an example of random selection of whether the overlapping part (circles marked with x) are printed in the first main scan A or the second main scan B.

FIG. 5 shows one embodiment of the print signal generating circuit according to the present invention, and the image data is stored in the main memory 1 and sent to a line buffer memory following the print order according to the controller 2 commands. The dot data for the overlapping part to be printed by the second main scan is sent to the line buffer 6 by the data

selector 2 [sic]. When the arrangement of the print dots in the overlapping part is systematic as in FIG. 2 and FIG. 3, the data selector 3 is specified by a counter 4, and when it is random as in FIG. 4, it is specified by a random number generator 4. The print data is sent to a charge code generator circuit 7 for each single scan. The charge code generator circuit 7 sends out the content of a deflection counter 8, and sends charge code data to a D/A converter 9, with conversion to an analog charge voltage in the D/A converter 9.

Effects

Since, as in the above, all or part of the dots in the present invention are either in the connecting part for the previous main scan or the next main scan, the effects of variations in paper feed and variations in dot positions are not concentrated in a single place as conventionally, but are distributed over the whole range, and stable images wherein the connections between lines are not obvious are obtained.

4. Brief Description of the Drawings

FIG. 1 is a drawing describing the scanning method when images are formed according to the present invention.

FIG. 2 – FIG. 4 are drawings showing dot arrangements according to the present invention.

FIG. 5 is a drawing showing an embodiment of a print signal generating circuit according to the present invention.

1 Main memory

2 Controller

3 Data selector

4 Counter or random number generator

5, 6 Line buffer

7 Charge code generating circuit

8 Deflection rank counter

9 D/A converter

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FIG. 1

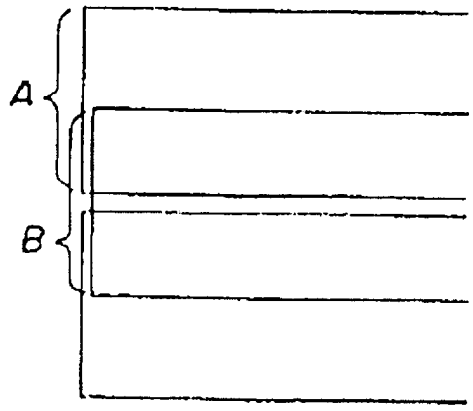


FIG. 2

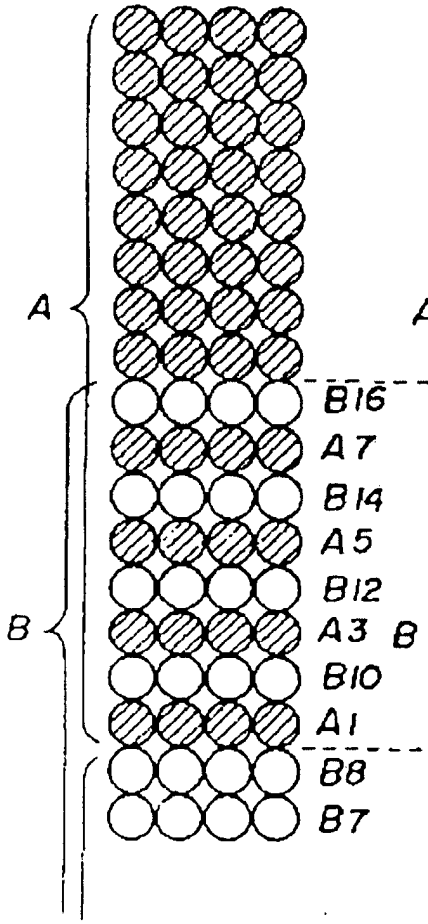


FIG. 3

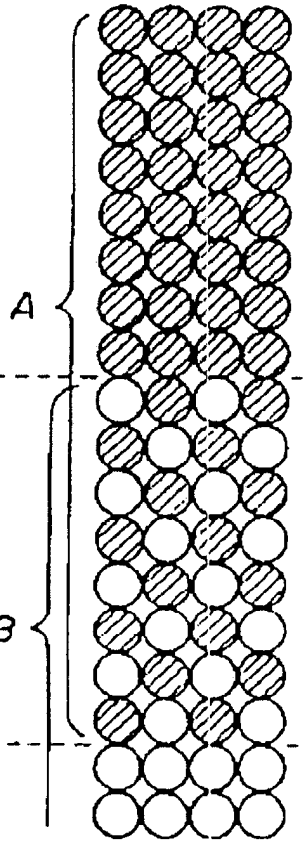


FIG. 4

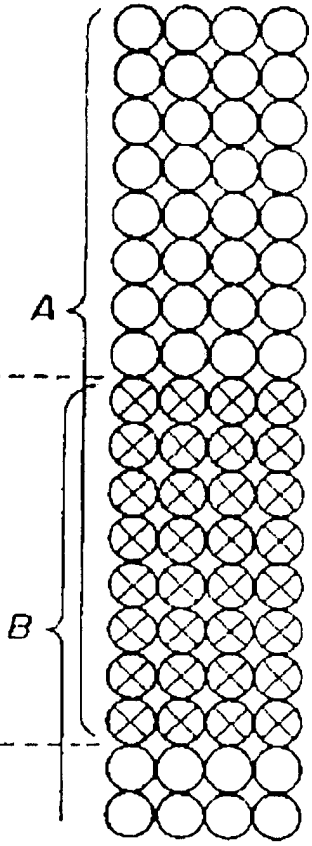
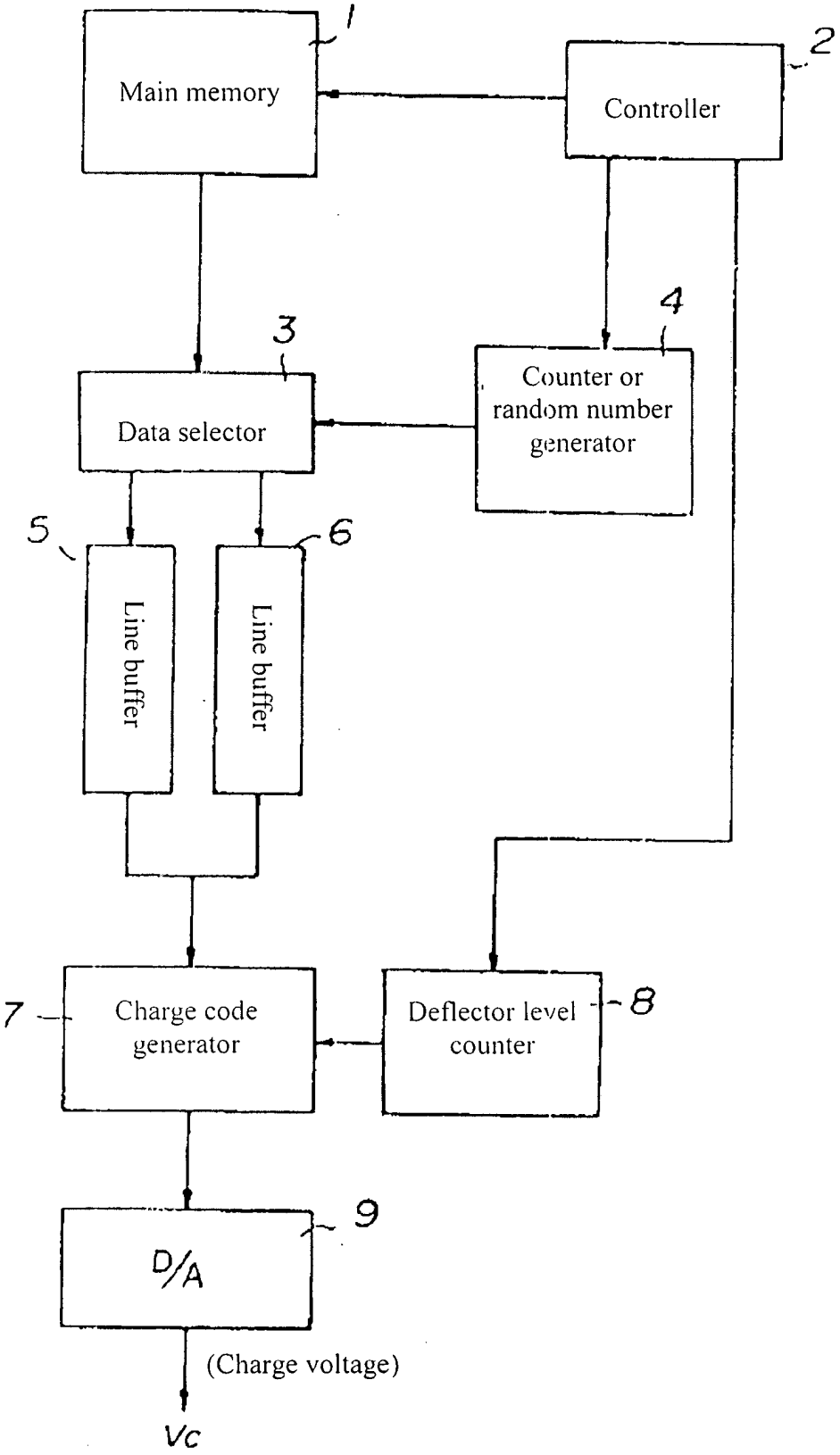


FIG. 5


Main memory
1
Controller
2
3
4
Data selector
Counter or random number generator
5
6
Line buffer
Line buffer
7
Charge code generator
Deflector level counter
8
9
D/A
(Charge voltage)
Vc

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C E R T I F I C A T I O N

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Mary Samaras – Assistant Director
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Sworn to before me on this 17th *day*
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My commission expires 10.7.05

BARBARA E. McCARRON
Notary Public
My Commission Expires
October 7, 2005

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